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What is Coming, Are You Ready?

Do you remember the phrase uttered by Paul Revere after seeing the signal lights in the church tower? If you remembered that he rode through towns and villages exclaiming: the British are coming! – The British are coming!, you get an A for high school history.

This form of early notification was rather primitive in the day of horse and rider. It ultimately evolved into other concepts of notification that were more sophisticated. Back to the history lesson, but do you remember the distant early warning system, or as some might remember from the Cold War, the DEW line.

Today we live in a world of almost instantaneous notification, but on the other hand we are often broadsided by news that has not been brought to our attention because we were not monitoring that channel. I recently had the opportunity to review some material from early on in the computer development days and was somewhat surprised by the following quote: "*A wealth of information creates a poverty of attention.*"¹ The author of this quote, Herbert Simon, a Nobel-prize winning economist, clearly recognized that at some point the computer was going to continue to create more and more information until pretty soon there was so much information available that no one could stay current.

One might make the case that we are there right now. How many of you readers are complaining of information overload right now?

There are two areas of fire protection that are being impacted by this phenomenon. The first of these is building construction. If anyone is keeping track of how many new products have come on the market in the last decade they are probably verging on a nervous breakdown. In other columns I have noted that it is very important that the fire service be paying attention to the construction approval process for building materials. There are many who focus their attention on this phenomenon, but most of them are in fire prevention bureaus. The operational side of the fire service keeps waiting for a product show up at the scene of an emergency before they get overly concerned about it. That is not a prudent course of action for our profession. It is absolutely essential that the fire service remain current on building technology.

The second area of fire protection has to do with changing content and behavior of fire within the changing building construction environment. There are a host of issues associated with this aspect of firefighting ranging from the chemicals in the rooms contents and the calorific value of synthetic products that is speeding up fire spread. I will not take time in this column to discuss the second aspect,

¹ Herbert Simon, 1978



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because I believe that chapter is still being written for future textbooks. Instead I would like to focus again on the need to remain current as to what is coming down from the research on building construction.

A new publication was recently published entitled: The Case For Tall Wood Buildings, How massive timber offers a safe, economical, and environmentally friendly alternative for tall building structures. The document was prepared by MGD architecture. The document explains the rationale for the industry interest in an emerging concept called Cross Laminated Timber (CLT). In this book there is a section on fire performance. Basic question I would pose here is how much does the American service know about the concept of Cross Laminated Timber? The second question is should you be aware of Cross Laminated Timber?

CLT is a multi-layer wooden panel made of dimensional lumber. Each layer of boards is placed cross-wise to the adjacent layers for increased rigidity and stability. Lengths of dimensional lumber (2x4, 2x6, 2x8) that are finger-jointed, are then set upon a large table at lengths up to 45 feet and widths of up to 10 feet. A glue is applied to the surface of the wood and then another layer is put on top cross-wise. It is not the same as a GluLam.

The panel can have three to seven layers, or more, normally in odd numbers, symmetrical around the mid layer. The solid wood building system consists of building components which are assembled to form complete frameworks. Dimensional lumber is the main input material. It is possible to use low grade for the interior layers and higher grades for the outside and it can be pre-dressed (planed) or dressed at the factory once that panel is assembled. While softwoods dominate, it is feasible to manufacture CLT using hardwoods like poplar or even hybrid panels (e.g., OSB, LSL, OSL, and LVL).

For purposes of definition, cross-laminated timber (CLT) is defined as a prefabricated solid engineered wood panel made of at least three or so orthogonally bonded layers of solid-sawn lumber or structural composite lumber (SCL) that are laminated by gluing of longitudinal and transverse layers with structural adhesive to form a solid rectangular-shaped, straight, and plain timber intended for roof, floor, or wall applications.

CLT is in use today all across Europe. It is described as a breakthrough in construction technology because of its versatility, ease of use, and fast construction times. The uses of the product itself are as a floor system to support the structure, as walls, providing sound and structural properties and as roof components for structural and non-structural support.

Because the wall, floors and ceilings are pre-fabricated whole, construction speed is described as being a fraction of the time for concrete tilt -up. Entire houses can be completed in one day, commercial projects are usually done in a week, industrial projects in a few weeks and high rises are completed in a



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few short months. This could allow the construction of a building that would normally take a year or more to be completed in as little as three months!

Manufacturers of CLT note that in areas with a short building window such as Northern or Southern climates where temperatures do not permit year-round building, CLT can significantly reduce construction time! In Europe completed projects have demonstrate the use of these panels in 10 story high rise buildings

What we should be interested in is: what this means to firefighters and incident commanders?

Here is some of the basic information that you might want to consider for operations purposes.

- Fire resistance - CLT has a burning rate of 0.67 mm per minutes.
- In a Building with CLT means that fire must travel through large area of solid timber surface with little cavity available for fire to burn and travel through.
- Heat Insulation - CLT walls are able to absorb a large amount of energy before releasing it into the atmosphere on the other side of the wall.

In another paper that has recently been distributed the scientific community states that the performance of these number of lamps with various lamination thicknesses using thermal and thermal-mechanical properties of wood, charring depths and the reduction of burning resistance that CLT performs as expected as a function of time fire exposure.²

The American National Standards Institute (ANSI) has produced a document that establishes a standard for performance-rated cross-laminated timber.³ This standard provides requirements and test methods for qualification in quality assurance regarding CLT. It is noted in this description that it makes no difference whether it is manufactured from solid-sawn lumber or structural composite lumber (SCL). This document provides some new terms that we might need to become more accustomed to once this product has a place in the market. For example there are two types of bond lines inherent in cross laminated timber. One of these is called a face bond line. The other is: edge bond line. The face bond line joins the larger dimension of the lamination (the face) and the edge bond line joins the smaller dimension the edges.

If you would like to obtain more specific information on this technology there is also a book printed by FPI Innovations. This book is labeled cross laminated timber: a primer and is edited by Pablo Crespel and

² Schmid, Joachim, Jorgen, Konig, Jochen, Kohler, Fire Exposed Cross Laminated Timber-Modeling and Test, World Conference on Wood Engineering.

³ Standard for Performance-Rated Cross Laminated Timber, ANSI/APA PRG-320-2011



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Sylvain Gagnon. It is listed as special publication 52. Frangi, Andrea, Fontana, Mario, Knobloch of ETH Zurich-The Institute of Structural Engineering from Switzerland and Bochicchio, Giovanna of CNR-IVALSA, from San Michele all'Adige, Italy, have produced a report on the Fire Behavior of Cross Laminated Solid Timber Panels⁴.

In summary - this is a new product that is likely to be in the market place in the near future. Our operations personnel should be looking into what this means for basic fire fighting. You are not going to be able to "punch a hole" through the drywall to make an escape. You will have a different set of circumstances for conducting overhaul, etc.

Well, if Paul Revere were to be alive today, he probably wouldn't be mounting up to spread the word, he would probably be texting and twittering to his heart's content. Stay tuned for the new information. Hope you are on the right channel.

⁴ Frangi, Andrea, Fontana, Mario, Knobloch The Institute of Structural Engineering from Switzerland and Bochicchio, Giovanna of CNR-IVALSA, from San Michele all'Adige, Italy [Fire Behavior of Cross Laminated Solid Timber Panels](#), September 26,2008.